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NAVAL WEAPONS STATION SEAL BEACH NAVAL STATION LONG  
BEACH FLEET MOORINGS (U) NAVAL FACILITIES ENGINEERING  
COMMAND WASHINGTON DC CHESAPEAKE.. 23 AUG 82  
CHES/NAUFAC-FPO-8242

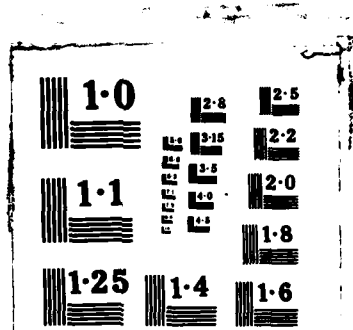
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**NAVAL WEAPONS STATION,  
SEAL BEACH  
NAVAL STATION LONG BEACH  
FLEET MOORINGS UNDERWATER  
INSPECTION PLAN**

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As part of COMNAVFACENGCOM's Fleet Mooring Maintenance Program, underwater  
inspections of existing fleet moorings are being conducted. NWS Seal Beach  
and NAVSTA Long Beach moorings have tentatively been scheduled for inspection  
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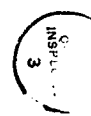
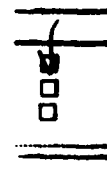
Currently a CHESNAVFACENGCOM assigned Project Engineer and a team of divers from UCT-2 are conducting underwater inspections of the fleet moorings operated and maintained by PWC San Diego personnel. After the completion of this inspection, on or about 23 August 1982, the CHESNAVFACENGCOM Engineer and UCT-2 divers will proceed to the Seal Beach/Long Beach area and prepare for the inspection of the 13 fleet moorings operated by the Naval Weapons Station, Seal Beach, and the single mooring operated by the Naval Station Ling Beach. It is anticipated that these inspections will commence about 26 August and require about ten days to complete.

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Availability Codes	
Dist	Avail and/or Special
A-1	23

**NWS SEAL BEACH/NAVSTA LONG BEACH  
FLEET MOORING UNDERWATER  
INSPECTION PLAN**

**1.0 BACKGROUND**

As part of COMNAVFACENGCOM's Fleet Mooring Maintenance Program, underwater inspections of existing fleet moorings are being conducted. NWS Seal Beach and NAVSTA Long Beach moorings have been tentatively scheduled for inspection during the latter part of August 1982.

Currently a CHESNAVFACENGCOM assigned Project Engineer and a team of divers from UCT-2 are conducting underwater inspections of the fleet moorings operated and maintained by PWC San Diego personnel. After the completion of this inspection, on or about 23 August 1982, the CHESNAVFACENGCOM Engineer and UCT-2 divers will proceed to the Seal Beach/Long Beach area and prepare for the inspection of the 13 fleet moorings operated by the Naval Weapons Station, Seal Beach, and the single mooring operated by the Naval Station Long Beach. It is anticipated that these inspections will commence about 26 August and require about ten days to complete.

**2.0 GENERAL DESCRIPTION OF THE FLEET MOORINGS TO BE INSPECTED**

**2.0.1 NWS Seal Beach.** NWS Seal Beach operates and maintains 13 fleet moorings. All of these moorings are located within the NWS Harbor Complex with eight installed in the outer harbor but inside the east and west jetties. These moorings are designated "Oscar 1" through "Oscar 8." Three are located to the west of the main entrance channel and five are located to the east of the channel. The remaining five fleet moorings are located in Anaheim Bay, the inner harbor located within the two beach fill areas. Three moorings designated "Echo 1" through "Echo 3" are installed in the southwestern portion of Anaheim Bay while the remaining two bow/ stern moorings (Buoy systems "Alfa 1" to "Alfa 4") are located in the eastern portion of the Bay. Figure 1 depicts the geographic positions of the Seal Beach fleet moorings.

During the mid 1970s, PWC San Diego personnel prepared design drawings of some (or perhaps all) of the Seal Beach moorings. CHESNAVFACENGCOM was able to obtain copies of the drawings of the three Echo moorings and four of the eight Oscar moorings. Copies of the design drawings of these seven moorings are contained in Annex A.





During 1979, the Navy signed a contract with the Peterson Company of Santa Monica, California, to conduct an underwater inspection of the 13 fleet moorings located at Seal Beach. This inspection was completed during November of 1979. A copy of the data accumulated as a result of this inspection (such as underwater voltmeter readings, mooring material as-builts, wire diameters at wear points, buoy conditions, etc) is contained in Annex B. Of interest is the fact that the as-built wire diameters, as reported by Peterson Company divers, do not agree with the PWC San Diego design drawings. Table 1 compares the differences in wire diameters noted in these two documents. During the current inspection divers must determine the actual in-water material composition of each buoy system in order to assist the CHESNAV FACENGCOM Engineer in developing correct and valid as-builts of each system. The results of this inspection should also determine whether the design drawings, the Peterson data, or both are inaccurate. The latest information concerning these moorings is contained in an enclosure to a NWS Seal Beach letter dated 9 April 1982. Pertinent data from this information follows:

U.S. NAVAL WEAPONS STATION, SEAL BEACH, CALIFORNIA

MOORING NUMBER	CLASS	WATER DEPTH (Ft.)	USEAGE	DATE ENTIRE MOORING LAST OVERHAULED	CON- DITION	NEXT SCHEDULED OVERHAUL
					*1	
0-1	ER	46	210	75/SEPT	GOOD	83/AUG
0-2	ER	36	365	80/AUG	GOOD	83/AUG
0-3	ER	35	365	75/MAR	GOOD	83/AUG
0-4	ER	30	210	80/AUG	GOOD	83/AUG
0-5	ER	38	365	80/AUG	GOOD	83/AUG
0-6	ER	30	365	80/AUG	GOOD	83/AUG
0-7	ER	37	210	80/AUG	GOOD	83/AUG
0-8	ER	20	210	80/AUG	GOOD	83/AUG
A-1	ER	39	365	73/DEC	GOOD	83/AUG
A-2	ER	39	365	73/DEC	GOOD	83/AUG
A-3	ER	18	365	80/AUG	GOOD	83/AUG
A-4	ER	36	365	80/AUG	GOOD	83/AUG
E-1	FR	40	365	74/JAN	GOOD	83/AUG
E-2	FR	40	365	80/AUG	GOOD	83/AUG
E-3	FR	40	365	80/AUG	GOOD	83/AUG

PROCUREMENT/MAINTENANCE: NONE  
 NO CHANGE IN LOCATIONS DURING PAST YEAR.  
 \*1 - ALL MOORINGS DIVER INSPECTED 11-15-79  
 SCHEDULED TO BE DIVER INSPECTED SEPT. 1982.

Note: All buoy systems are scheduled for overhaul in FY83.

TABLE 1  
DESIGN DRAWING CHAIN SIZES VS  
PETERSON COMPANY REPORTED SIZES

BUOY	LEG	PETERSON REPORT		PWC DESIGN DRAWINGS (IN)	REMARKS
		SIZE AT WEAR POINT (IN)	ORIGINAL SIZE (IN)		
ECHO 1	riser	2-5/8	2-3/4	2-3/8	Connected to Echo 2 Leg 4
	1	—	—	2-1/2	
	2	2-3/8	2-3/4	2-1/4	
	3	2-3/8	2-3/4	2-1/2	
ECHO 2	riser	2-1/2	2-1/2	2-3/8	Connected to Echo 3 Leg 3 Connected to Echo 1 Leg 2
	1	—	—	2-1/2	
	2	2-1/2	2-3/4	2-1/2	
	3	—	—	2-1/2	
ECHO 3	riser	2-3/4	2-3/4	2-3/4	Connected to Echo 2 Leg 2
	1	—	—	2-1/2	
	2	2-1/2	2-3/4	2-1/2	
	3	2-1/2	2-3/4	2-1/2	
OSCAR 2	riser	2-1/2	2-3/4	2-3/4	Drawing Legs not Labeled
	1	2-5/8	2-3/4	—	
	2	2-1/4	2-3/4	—	
	3	2-1/2	2-3/4	—	
OSCAR 3	riser	2-1/2	2-1/2	2-3/4	
	1	—	2-1/2	2-1/4	
	2	2-1/4	2-1/2	2-1/4	
	3	2-3/8	2-1/2	2-1/4	
OSCAR 5	riser	2-3/8	2-3/4	2-1/2	
	1	2-5/8	2-3/4	2-1/2	
	2	2-5/8	2-3/4	2-1/2	
	3	2-5/8	2-3/4	2-1/2	
OSCAR 6	riser	2-1/2	2-3/4	2-1/2	
	1	2-1/2	2-3/4	2-1/2	
	2	2-1/2	2-3/4	2-1/2	
	3	2-1/2	2-3/4	2-1/2	

PWC Design Drawings for Buoy Systems Alfa 1-4 and  
Oscar 1, 4, 7, & 8 not Available.

**2.0.2 NAVSTA Long Beach.** The single Class A telephone-type mooring at this installation is located in the artificial harbor enclosed by the "mole" breakwater (Figure 2). The exact date of installation is unknown, but as-built drawings (Figure 3) indicate that the mooring has been in place since at least 1956. The mooring was overhauled in 1981. However, no updated mooring data is available. As-builts also show that the mooring was designed as a "Class A" mooring even though there are minor deviations from DM-26 guidelines in hardware component size and configuration. More significant is the fact that the length of ground legs is far less than the length specified in DM-26 for the 52' water depth (mean high water) used as design criteria: DM-26 calls for 4-1/2 shots per leg, while as-builts show only about 3-1/4 to a maximum of 4 shots. Three of the four legs are anchored by 25,000 lb Navy stockless anchors, while one leg has a "12 ton" anchor; no sinkers are indicated. There is no evidence of cathodic protection on the ground legs, nor is there any information concerning the buoy as to either its size, type, or composition.

### **3.0 INSPECTION PROCEDURES**

The inspection scenario is to conduct a diver inspection of each of the 14 moorings (13 in Seal Beach, 1 in Long Beach) using scuba equipment. Physical measurements will be taken using pre-cut gauges and calipers. Accurate position data will be generated for the buoys and the ground legs. The buoys will be sighted from known reference locations on land. The ground leg orientation will be determined by marking anchor locations, if found, with marker buoys and sighting from the mooring buoy. Potential readings will be taken using underwater voltmeters on any mooring or buoys found to be cathodically protected. Measuring equipment and techniques will be the same as those described in PWC San Diego Inspection Plan.

NOTE: It is essential that all suspected trouble spots be inspected thoroughly and called to the attention of the CHESNAVFACENGCOM engineer, regardless of the scheduled sampling intervals.

The following general inspection procedures will be followed:

**3.1 Site Survey:** Each buoy is to be accurately sighted from land. If a ship is moored, this is to be noted along with current and wind speeds and directions at the time of the survey. The water total depth at each mooring buoy should be recorded.

**3.2 Buoy:**

**3.2.1 Buoy Topside:** The buoy shall be observed to determine its general condition. The buoy markings shall be checked for conformance to those noted in applicable



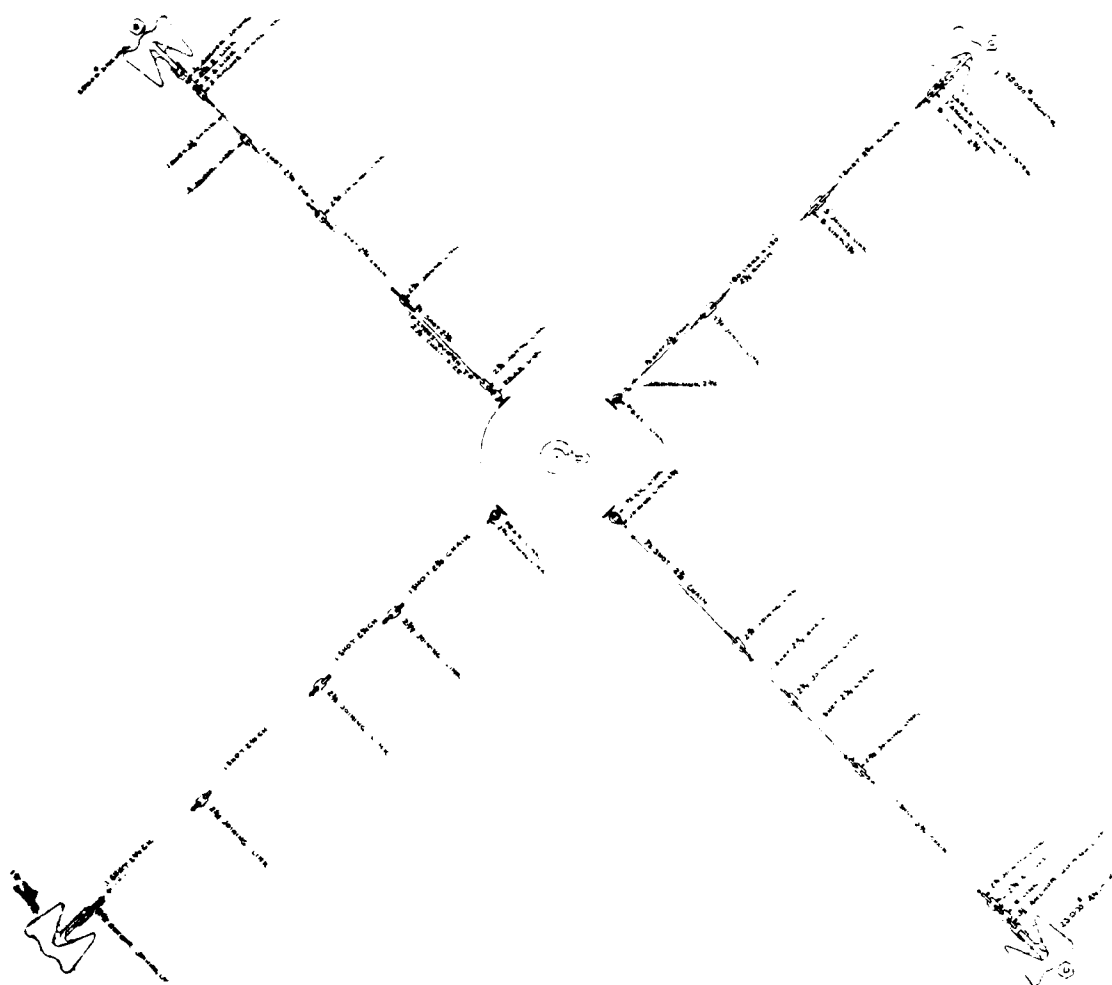


Figure 3. Long Beach Mooring Design Drawing

charts. The size of the buoy (diameter and height) should be recorded along with its freeboard. Physical damage such as holes, dents, or listing shall be described. If the buoy is fiberglass coated, then the fiberglass should be inspected for cracks, wear, peeling, or rust-bleeding. A check will be made to see if the hatches have been fiberglassed over. If the buoy has not been fiberglassed, then the paint will be checked for cracking, chipping, and peeling. Hatches, openings, and penetrations will be examined and broken parts and rust will be reported.

The buoy fenders and rubbing rails shall be checked for integrity and secure connection to the buoy.

Buoy top jewelry shall be described and measured with calipers to find the overall outside dimensions and areas of most severe reduction in wire size.

**3.2.2 Buoy Lower Portion:** Divers shall thoroughly inspect the buoy below the waterline. The thickness of marine growth shall be recorded, three one-foot-square areas shall be selected and cleared of growth without damaging the paint or fiberglass, and the condition of the paint or fiberglass will be noted. If the buoy is a riser-type with a hawse pipe, the presence and condition of the rubbing casting shall be recorded. If the buoy is cathodically protected, the condition, dimensions, and connection of anodes are to be noted. Then, electrical potential readings are to be taken with an underwater voltmeter at three locations on the buoy bottom.

**3.3 Bottom Jewelry:** On all moorings, the bottom jewelry connecting the buoy to the riser (or to the ground legs in a telephone mooring) shall be identified and measured with calipers. Again, as in the topside jewelry, the overall dimensions and the smallest wire size will be recorded.

**3.4 Chain:** Each 90 foot shot or large portion of chain will be inspected by measuring the wire diameter of the chain and the connecting hardware to determine the amount of corrosion and wear.

For riser chain, three (3) consecutive double-link measurements, using precut gauges, will be made at both ends and at the center of each length of chain to the ground ring.

For ground leg chain, three (3) consecutive double-link measurements will be made at both ends and at the center of each shot of chain until the anchor is reached. The shots

of chain are joined with detachable links which will be marked with plastic tags for future reference. If detachable links are not easily identified due to heavy growth or poor visibility, the chain will be marked and measured at 45 foot intervals. Where a segment of chain is resting on the bottom and is not in tension, single-link measurements will replace double-link measurements.

All connecting hardware including detachable links, anchor joining links, pear links, end links, swivels and shackles shall be identified and measured with calipers. Worn hardware and unusual chain joining practices shall be recorded and photographed.

- 3.5 Ground Ring (Riser Type Only):** The ground ring shall be examined for general and localized wear. Caliper measurements shall be made of the wire size in the region of the most severe wear and across the inner diameter. Divers will record the depth of the water from the ground ring to the surface.

- 3.6 Anchors:** The hardware connecting the anchors to the ground legs shall be measured by calipers in the same manner as the bottom jewelry.

When located, an anchor shall be marked with a marker buoy so that its relative position from the mooring buoy is visible from the surface. This position shall be recorded. The length of chain from the ground ring to the anchor (or to the point where the chain enters the mud) will be recorded. The condition, orientation and type of each anchor located will be recorded.

At each anchor location, a description of the bottom type shall be recorded.

- 3.7 Cathodic Protection:** Any moorings found to have cathodic protection should be inspected using the following procedures.

The underwater voltmeter will be used to probe the chain every 45 feet commencing with the buoy and bottom jewelry and continuing until the anchor is reached or the chain disappears into the bottom. Before cleaning, divers will photograph each anode and record the thickness, type and accumulation of the coating. Several anodes should be brushed to remove the oxidation and the length, width and depth of the remaining zinc measured and photographed. Anodes in poor condition should be measured, reported and photographed.



#### 4.0 DOCUMENTATION

- 4.1 **Written:** The CHESNAVFACENGCOM Engineer will document the inspection procedures used and record the data obtained by the diving team. The Engineer will recommend additional alternative inspection requirements as deemed necessary during the course of the inspection.

While on site, the CHESNAVFACENGCOM Engineer will investigate the availability and cost of local mooring maintenance support.

The CHESNAVFACENGCOM Engineer will organize all data pertaining to the inspection and turn it over to the fleet mooring archives maintained at FPO-1.

The CHESNAVFACENGCOM Engineer will write a Fleet Mooring Inspection Report which will contain the results of the inspection and recommendations for corrective maintenance actions. This report, when approved by CHESNAVFACENGCOM, will be forwarded to all interested commands.

#### 4.2 **Photographic:**

**Topside:** Topside photography and ashore photographs are the responsibility of the CHESNAVFACENGCOM Engineer.

Photographs will be taken of all buoys showing general conditions. Photographs of the topside jewelry and damaged buoy components will be taken as deemed appropriate by the CHESNAVFACENGCOM Engineer.

Photographs will be taken of ashore spare mooring material inventories and construction equipment as deemed necessary.

**Underwater:** Underwater photography shall be the responsibility of UCT-2. Buoy bottoms, anodes, bottom jewelry, worn links, working swivels, ground rings, and other hardware shall be photographed wherever required to support material conditions and when environmentally feasible. Photographs shall include clear annotation as to the location of the hardware being photographed.

## **5.0 MEETINGS/BRIEFINGS**

Upon arrival on site, the CHESNAVFACENGCOM Engineer will conduct a pre-dive briefing to familiarize all diver personnel with component design and inspection criteria.

Prior to commencement of the inspection, a meeting will be held with station personnel to confirm logistic support.

A post-inspection briefing will be provided to advise station personnel of preliminary inspection findings.

After return to Washington, D.C., presentations will be given to FPO-1 personnel.

## **6.0 LOGISTICS**

The CHESNAVFACENGCOM Engineer has obtained from NWS Seal Beach and NAVSTA Long Beach all available information concerning moorings' history, drawings, as-built data, maintenance records and schedules, and usage.

The following equipment will be provided by UCT-2 in support of the inspection:

- All diving support equipment sets
- Measuring aids
  - Outside calipers 24 inch minimum
  - 100' tape measures
  - Scales 1, 2, and 3 feet with large numbers suitable for photo documentation
  - Go-no-go gauges (2 complete sets)
  - Accurate depth gauges
- Survey equipment
  - Compass (divers)
  - Survey buoys with line (pop floats)
- Two underwater still cameras (35mm) with film (color and B&W) flash with spare batteries

- Underwater voltmeters (2) with spare batteries, reference cell, and operations manual
- Cleaning equipment - Hand tools including wire brushes, chipping hammers, and sharp chisels. Water blaster with water or hydraulic power supply and brush tool.
- Waterproof paper
- Lift bags - two (2,000 pound capacity)
- Marker tags to relocate or mark chain links
- Maintenance hand tools, including strong bars, hacksaws, puller hoists, cable cutter, shovels, rigging, wire slings.

The CHESNAVFACENGCOM Project Engineer will provide the following:

- Inspection plan
- Data sheets and log books
- 35mm surface camera and film
- Drafting supplies, graph paper, scales
- Calculator
- Full-size and 1/2-size drawings
- Pre-dive briefing data
- DM 28

## 7.0 TRANSPORTATION

Transportation of personnel and equipment will be the responsibility of UCT-2 as well as arranging for on-site berthing and messing. The CHESNAVFACENGCOM Engineer will arrange his own transportation and will meet the team on site on the date selected.

## **8.0 MESSAGE TRAFFIC**

Summary status reports will be prepared on site by UCT-2 personnel and reported via message on a weekly basis to CHESNAVFACENGCOM and the UCT's home port.

**ANNEX A**

**PWC SAN DIEGO DESIGN DRAWINGS**





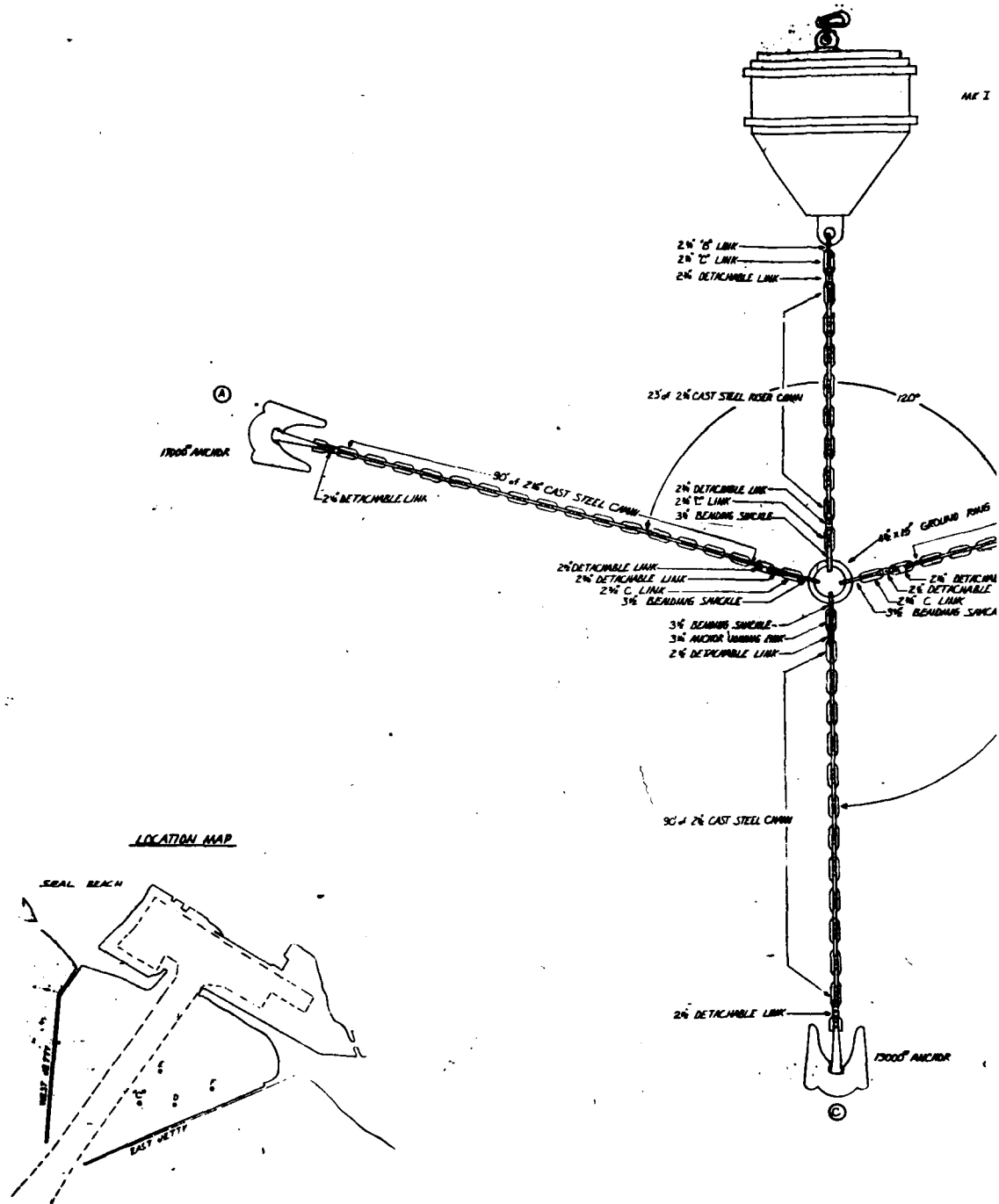


Figure 5. NWS Seal Beach Mooring "OSCA"



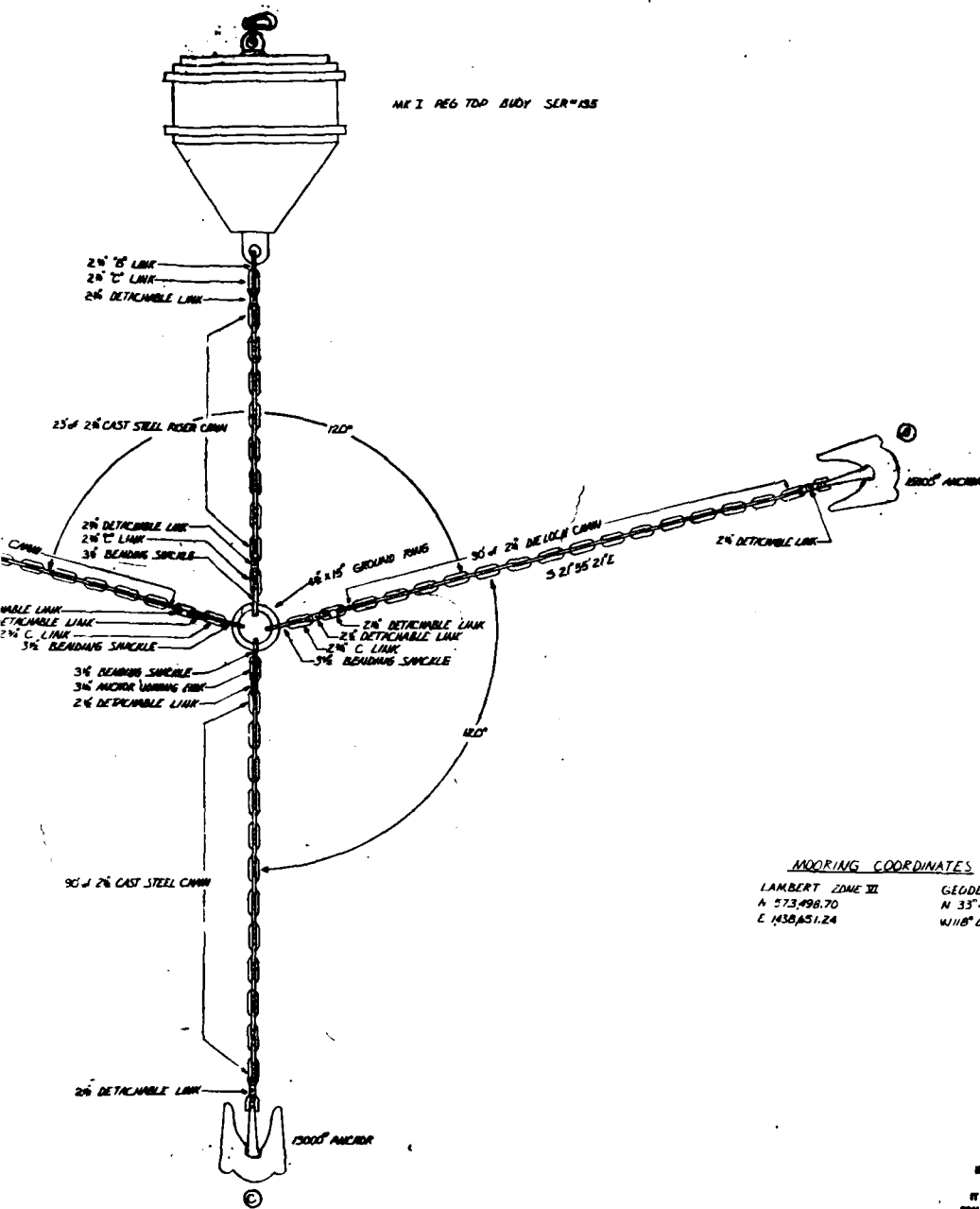


Figure 5. NWS Seal Beach Mooring "OSCAR-2"

IF SHEET IS LESS THAN  
30" X 40"  
IT IS A REDUCED PRINT -  
SCALE REDUCED ACCORDINGLY

PROJ NO. 19925	DEPARTMENT OF THE NAVY	CHIEF ENGINEER'S OFFICE
FILE NO.	PUBLIC WORKS CENTER	SAN DIEGO, CALIF.
DATE	SEAL BEACH ANCHOR WEAPONS STATION	
BY	OSCAR MOORING "C" (2)	
CHKD BY		
APP'D BY		
DATE		
SCALE		

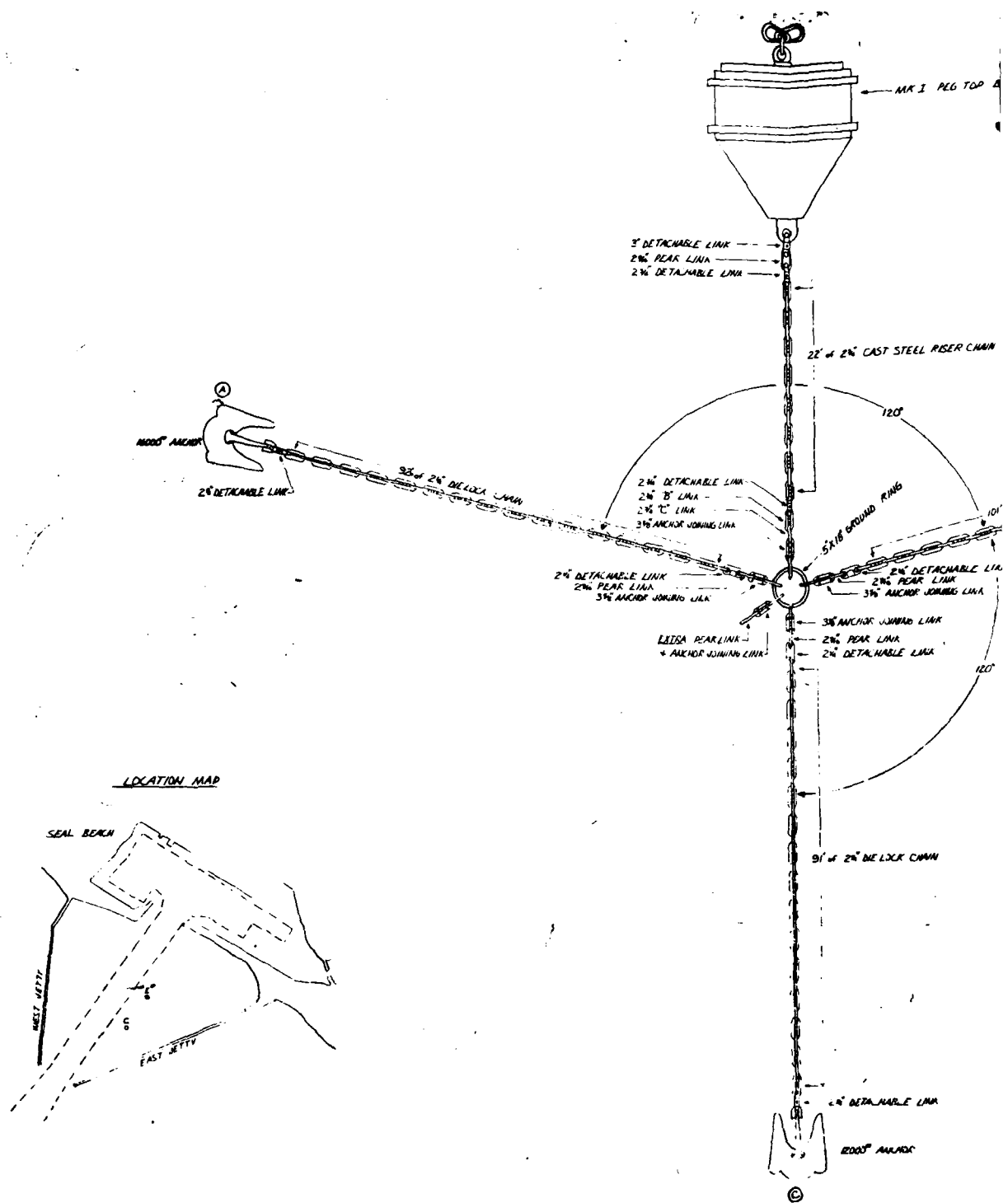
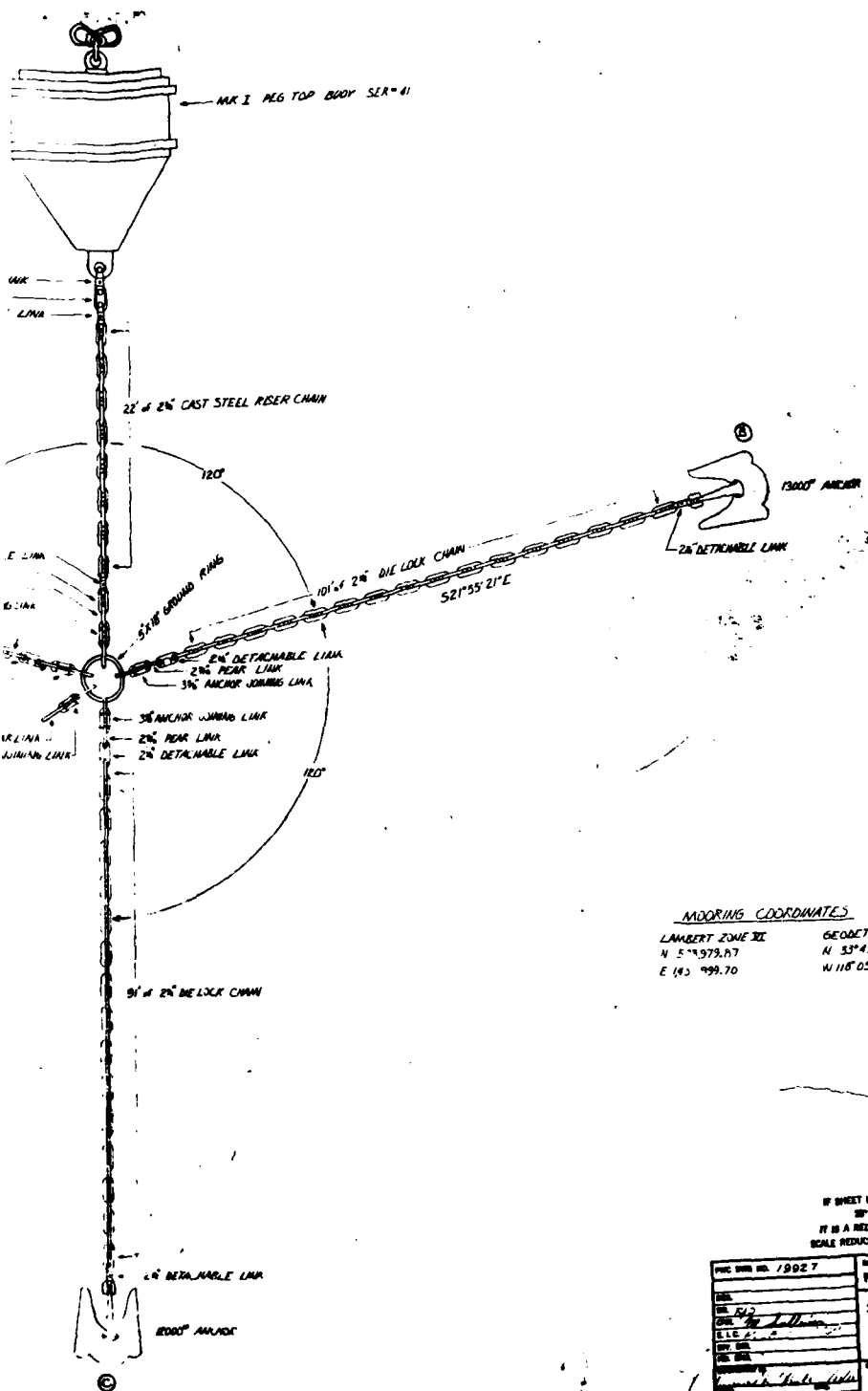


Figure 6. NWS Seal Beach Mooring "OSCAR-3"



MOORING COORDINATES  
 LAMBERT ZONE XII  
 N 5° 57' 3.07"  
 E 185° 59' 9.70"

GEOIDETIC  
 N 33° 43' 49.986"  
 N 118° 05' 42.617"

IF SHEET IS LESS THAN  
 36" x 48"  
 IT IS A REDUCED PRINT -  
 SCALE REDUCED ACCORDINGLY

FWS FORM NO. 19927		DEPARTMENT OF THE NAVY		SEAL BEACH, CALIF.	
PUBLIC WORKS CENTER		SEAL BEACH			
DATE: 12/2		ANIMAL WEARING STATION			
DRAWN BY: [Signature]		OSCAR MOORING "E" (3)			
CHECKED BY: [Signature]		DATE: 12/2			
APPROVED BY: [Signature]		SCALE: 1" = 100'			

IWS Seal Beach Mooring "OSCAR-3"

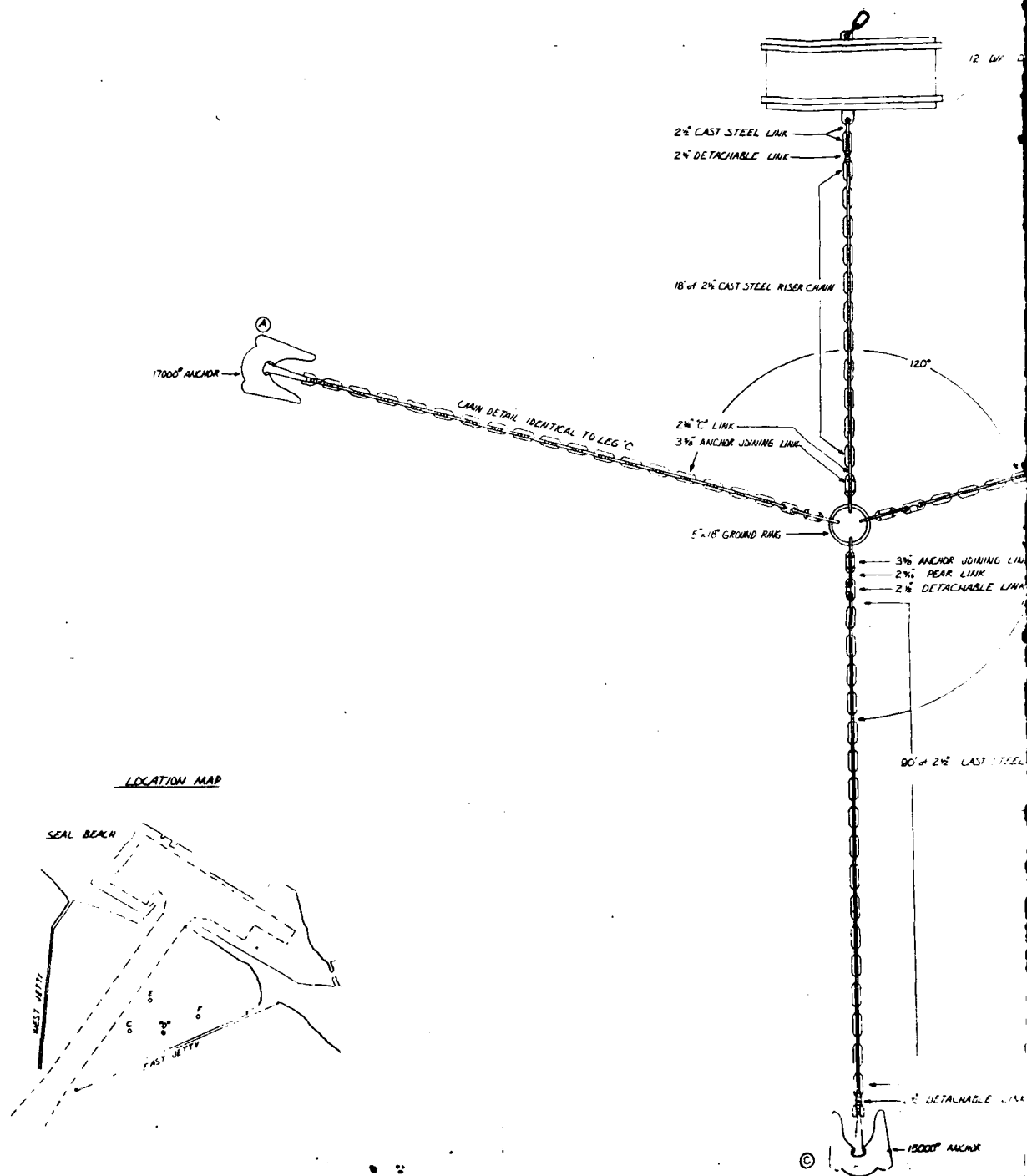


Figure 7. NWS Seal Beach Mooring "OSCA"

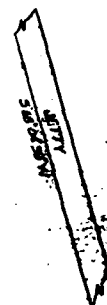
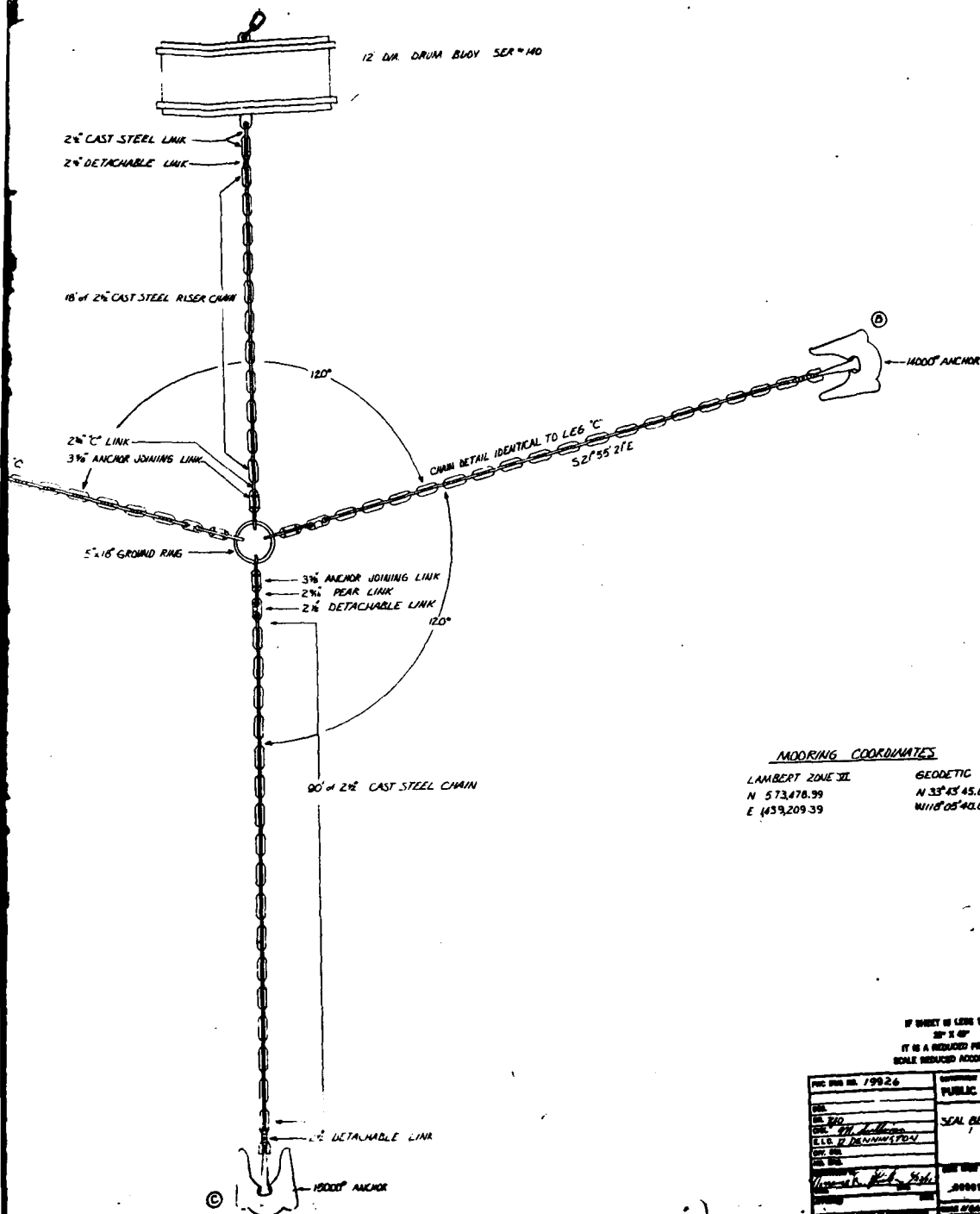


Figure 7. NWS Seal Beach Mooring "OSCAR-5"

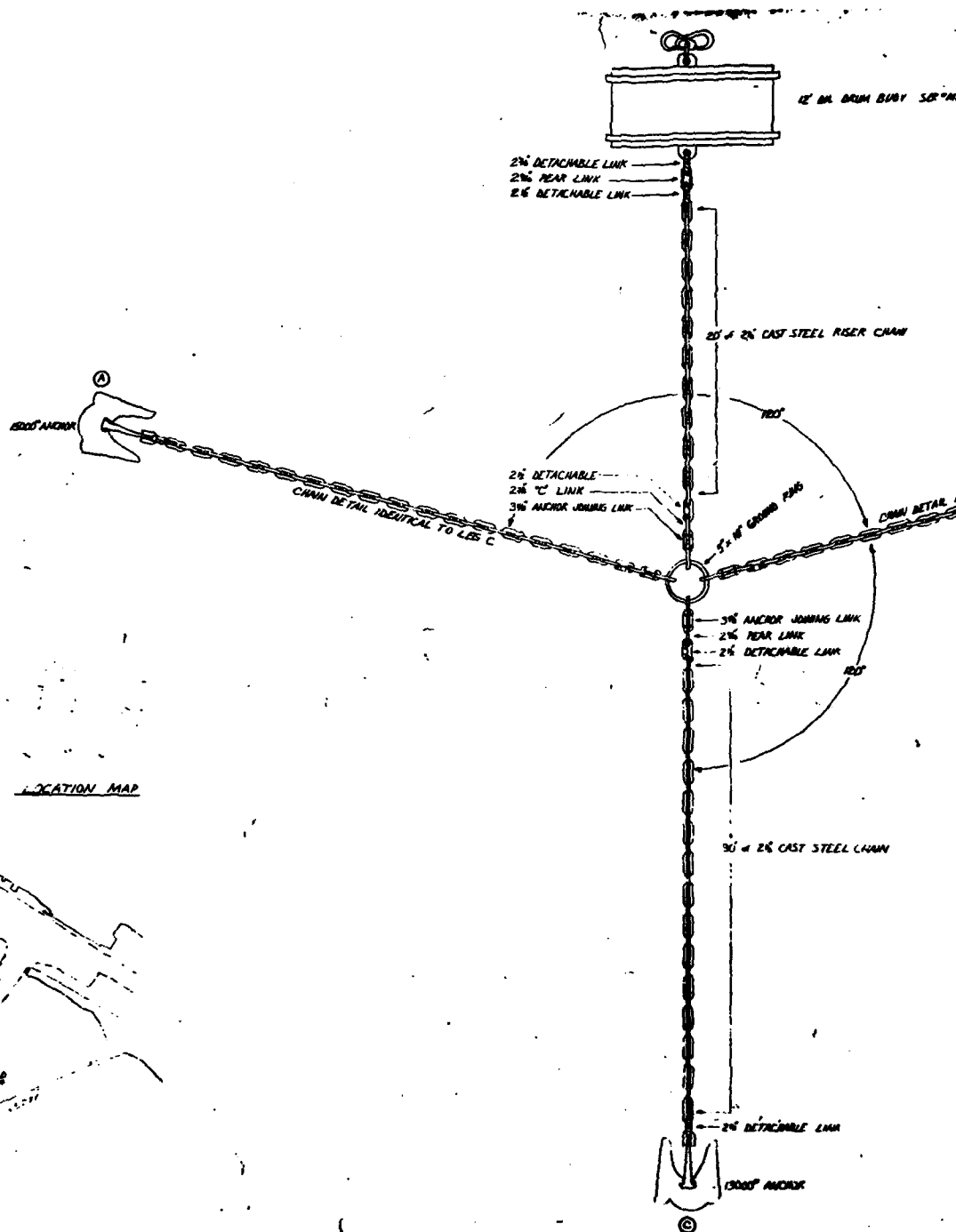
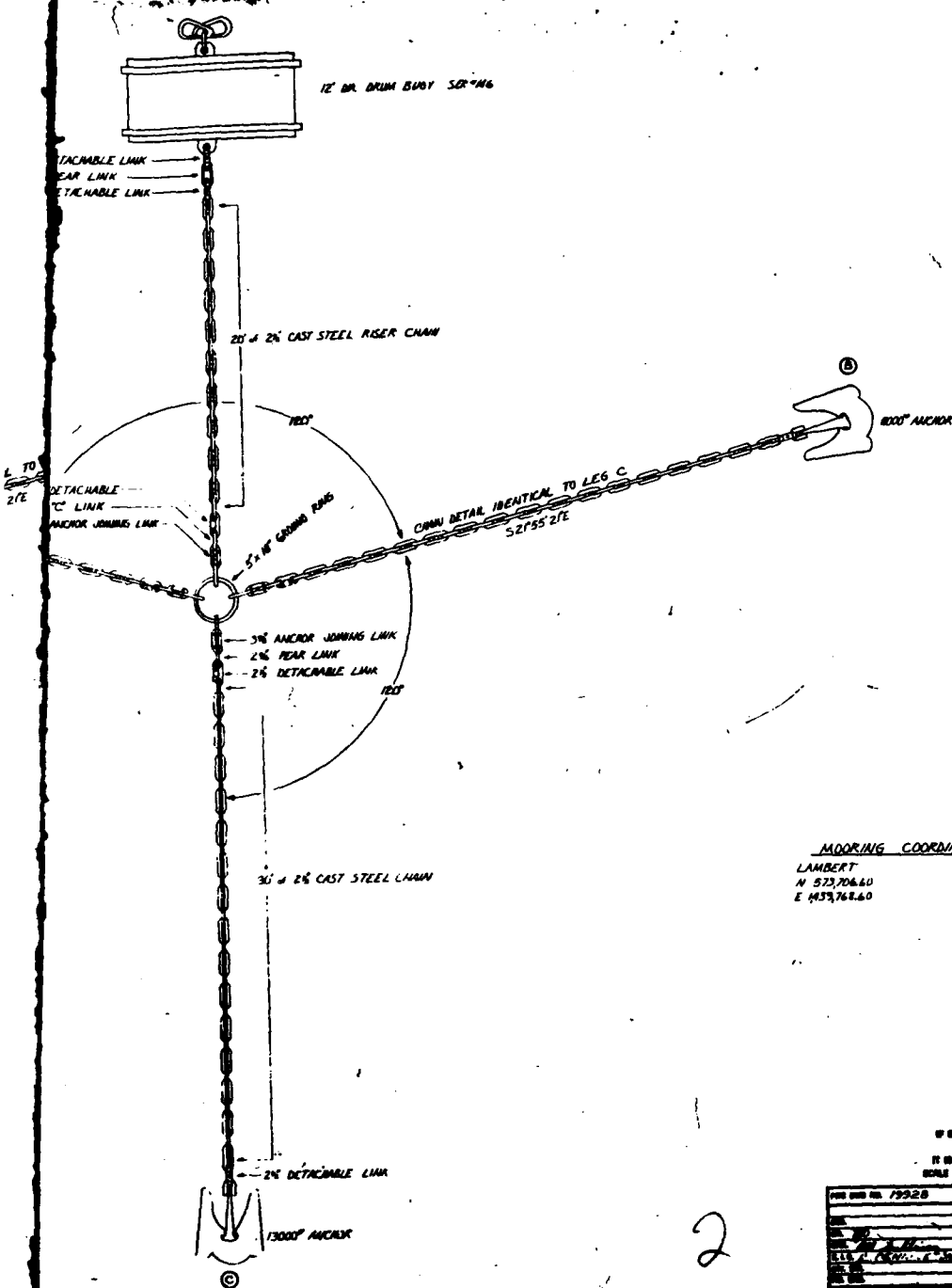


Figure 8. NWS Seal Beach Mooring "OSCAR-6"



#### MOORING COORDINATES

LAMBERT  
N 523,706.60  
E 433,768.60

GEODETIC  
N 33°43' 47.417"  
W 116°05' 33.457"

IF SHEET IS LESS THAN  
30" X 40"  
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FIG. NO. 79928	APPROVED BY THE DISTRICT ENGINEER
	PUBLIC WORKS CENTER SAN DIEGO, CALIF.
	SEAL BEACH
	ANCHOR
	ANCHOR

Figure 8. NWS Seal Beach Mooring "OSCAR-6"

A-6

**ANNEX B**

**PETERSON COMPANY RESULTS OF  
UNDERWATER INSPECTION**



AS-BUILTS FROM PETERSON REPORT (11/79)

BUOY	LEG	CHAIN SIZE (IN)	REMARKS
ALFA 1	riser	2-3/4	
	1	2-3/4	
	2	2-3/4	
	3	2-1/2	
ALFA 2	riser	2-3/4	
	1	2-3/4	
	2	2-3/4	
	3	2-3/4	
ALFA 3	riser	2-3/4	
	1	2-3/4	
	2	2-5/8	
	3	2-5/8	
ALFA 4	riser	2-3/4	
	1	2-3/4	
	2	2-3/4	
	3	2-3/4	
ECHO 1	riser	2-3/4	
	1	—	No Data
	2	2-3/4	
	3	2-3/4	
ECHO 2	riser	2-1/2	
	1	—	No Data
	2	2-3/4	
	3	—	Leg not shown on drawings
	4	2-3/4	
ECHO 3	riser	2-3/4	
	1	—	No Data
	2	2-3/4	
	3	2-3/4	
OSCAR 1	riser	2-3/4	
	1	2-3/4	
	2	2-3/4	
	3	2-3/4	
OSCAR 2	riser	2-3/4	
	1	2-3/4	
	2	2-3/4	
	3	2-3/4	

AS-BUILTS FROM PETERSON REPORT (11/79)  
(Continued)

BUOY	LEG	CHAIR SIZE (IN)	REMARKS
OSCAR 3	riser	2-1/2	
	1	2-1/2	
	2	2-1/2	
	3	2-1/2	
OSCAR 4	riser	2-3/4	
	1	2-3/4	
	2	2-3/4	
	3	2-3/4	
OSCAR 5	riser	2-3/4	
	1	2-3/4	
	2	2-3/4	
	3	2-3/4	
OSCAR 6	riser	2-3/4	
	1	2-3/4	
	2	2-3/4	
	3	2-3/4	
OSCAR 7	riser	2-1/2	Installed during inspection
	1	—	Leg not found
	2	—	Leg not found
	3	—	Leg not found
OSCAR 8	riser	2-5/8	
	1	2-5/8	
	2	2-5/8	
	3	3	

# *Peterson Company*

## REFERENCE CELL READINGS

A silver-silver-chloride reference cell with a Beckman #310 digital read-out meter was used for taking the readings. All readings were rounded off to the nearest hundredth volt. A ground line was attached to the buoy and underwater readings were taken by a diver at each side of the buoy (the side away from the zincs), buoy eye, at every other chain link and at the ground ring or bottom. No readings were taken at Alpha 1, because it is a fiberglass buoy.

	<u>Alpha 2</u>	<u>Alpha 3</u>	<u>Alpha 4</u>
Side	.77 volts	.90 volts	.86 volts
Side	.77 volts	.87 volts	.89 volts
Eye	.80 volts	.87 volts	.94 volts
	.78 volts	.86 volts	.92 volts
	.77 volts	.83 volts	.91 volts
	.76 volts	.84 volts	.91 volts
	.75 volts	.84 volts	.91 volts
	.75 volts	.83 volts	.90 volts
	.75 volts	.83 volts	.95 volts
	.75 volts	.80 volts	.96 volts
	.75 volts	.82 volts	.96 volts
	.74 volts	.82 volts	.96 volts
	.74 volts	.80 volts	.96 volts
	.74 volts	(G.R.)	.97 volts
	.74 volts		.97 volts
	.74 volts		.97 volts
	.73 volts		.97 volts (G.R.)
	.73 volts (G.R.)		

### REFERENCE CELL READINGS

**B-5**

*Peterson Company*

REFERENCE CELL READINGS

	<u>Oscar 1</u>	<u>Oscar 2</u>	<u>Oscar 3</u>	<u>Oscar 4</u>
Side	.72 volts	.81 volts	.76 volts	.85 volts
Side	.72 volts	.83 volts	.79 volts	.86 volts
Eye	.80 volts	.83 volts	.78 volts	.86 volts
	.71 volts	.83 volts	.77 volts	.85 volts
	.72 volts	.81 volts	.76 volts	.84 volts
	.71 volts	.82 volts	.75 volts	.84 volts
	.70 volts	.80 volts	.74 volts	.83 volts
	.69 volts	.80 volts	.71 volts	.82 volts
	.69 volts	.80 volts	.74 volts	.82 volts
	.68 volts	.79 volts	.74 volts	.82 volts
	.68 volts	.79 volts	.74 volts	.81 volts
	.68 volts	.79 volts	.73 volts	.81 volts
	.68 volts	.78 volts	.73 volts	.81 volts
	.67 volts	.78 volts	.73 volts	.81 volts
	.67 volts	.78 volts	.73 volts	.81 volts
	(G.R.)	.76 volts	.72 volts	.81 volts
		(G.R.)	.71 volts	.81 volts
			(G.R.)	.81 volts
				.81 volts
				.79 volts
				.78 volts
				(G.R.)

# *Peterson Company*

## REFERENCE CELL READINGS

	<u>Oscar 5</u>	<u>Oscar 6</u>	<u>Oscar 7</u>	<u>Oscar 8</u>
Side	.75 volts	.96 volts	.82 volts	.89 volts
Side	.76 volts	.90 volts	.84 volts	.89 volts
Eye	.74 volts	.89 volts	.83 volts	.88 volts
	.73 volts	.89 volts	.81 volts	.86 volts
	.73 volts	.82 volts	.80 volts	.90 volts
	.73 volts	.81 volts	.75 volts	.89 volts
	.73 volts	.80 volts	.74 volts	.88 volts
	.73 volts	.78 volts	.76 volts	.85 volts
	.73 volts	.77 volts	.77 volts	.87 volts
	.72 volts	.77 volts	.78 volts	.85 volts
	.72 volts	.76 volts	.78 volts	.83 volts
	.72 volts	.76 volts	.76 volts	.82 volts
	.72 volts (G.R.)	.78 volts (G.R.)	.76 volts	.79 volts
			.79 volts	.80 volts
			.79 volts	.88 volts
			.79 volts	.88 volts
			.80 volts	.88 volts
			.80 volts	.78 volts
			.76 volts	.88 volts
			.77 volts	.87 volts
			.78 volts	.88 volts
			.78 volts	.87 volts
			.76 volts	.87 volts
			.80 volts	.88 volts
			.76 volts	.87 volts
			.80 volts (Mud line)	.86 volts
				.86 volts
				.87 volts
				.89 volts
				.90 volts
				.90 volts (Mud line)

*Peterson Company*

MOORING OVERHAUL 1980

Final Buoy Locations

<u>Mooring #</u>	<u>Buoy Serial #</u>	<u>Prior Location</u>	<u>Buoy Type</u>
Alpha 1		Alpha 1	Drum *
Alpha 2	120	Alpha 3	Drum
Alpha 3	140	Oscar 5	Drum
Alpha 4	146	Oscar 6	Drum
Echo 1	22	Echo 1	Peg
Echo 2	138	Oscar 4	Peg
Echo 3	16	Oscar 2	Peg
Oscar 1	119	Alpha 2	Drum
Oscar 2	137	Oscar 1	Peg
Oscar 3	141	Alpha 4	Drum
Oscar 4	41	Oscar 8	Peg
Oscar 5	17	from the beach	Peg
Oscar 6	21	Echo 2	Peg
Oscar 7	55	Echo 3	Peg
Oscar 8	135	Oscar 3	Peg

\* Alpha 1 is a fiber glass-foam filled buoy

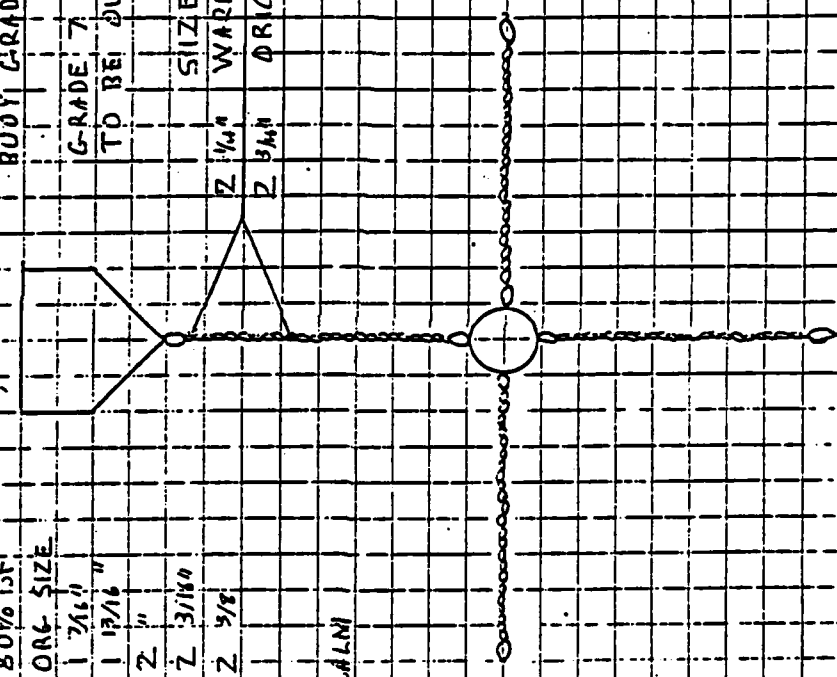
DATE 11/15/79 U.S. NAVY SEAL BEACH WEAPONS STATION N 62474-79-B-4252  
 11/16/79 FLEET MOORING INSPECTION MOORING NO. 1  
 AS BUILT 11/5/81 WATER DEPTH  
 CONTRACTOR: PETERSON CO.

NTS  
 SYMBOLS  
 10 = VERY GOOD  
 8 = FAIR  
 3 = POOR  
 BUOY GRADE:  
 GRADE 7 OR UNDER NEEDS TO BE OVERHAULED  
 SIZE OF CHAIN AT WARE POINT  
 ORIGINAL SIZE

80% LF  
 ORG. SIZE ORG. SIZE  
 2" 1 7/16" 1 13/16"  
 2 1/4" 2"  
 2 1/2" 2"  
 2 3/4" 2 3/16"  
 3 2 5/8"

WEATHER: CLEAR & CALM

PERSONNEL  
 DIVER/TENDER:  
 PAUL JOHNS  
 STEVE STURGES  
 RICHARD DAVIES  
 BOAT OPERATOR:  
 PETE PETERSON  
 NOTES:  
 JOHN PETERSON





DATE 11/16/74 U.S. NAVY SEAL BEACH WEAPONS STATION! MOORING NO. ALPHA-2

WATER DEPTH 44  
TIDE 3.00  
AUTOSTOP 200

BUOY GRADE 101  
BUOY EYE 5"

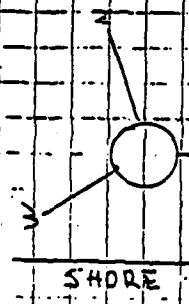
No Z's installed  
This is a Fiberglass  
buoy

ALPHA 1

AS BUILT 11/15/81

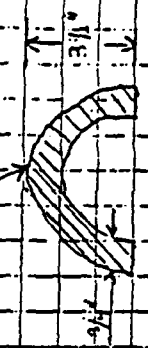
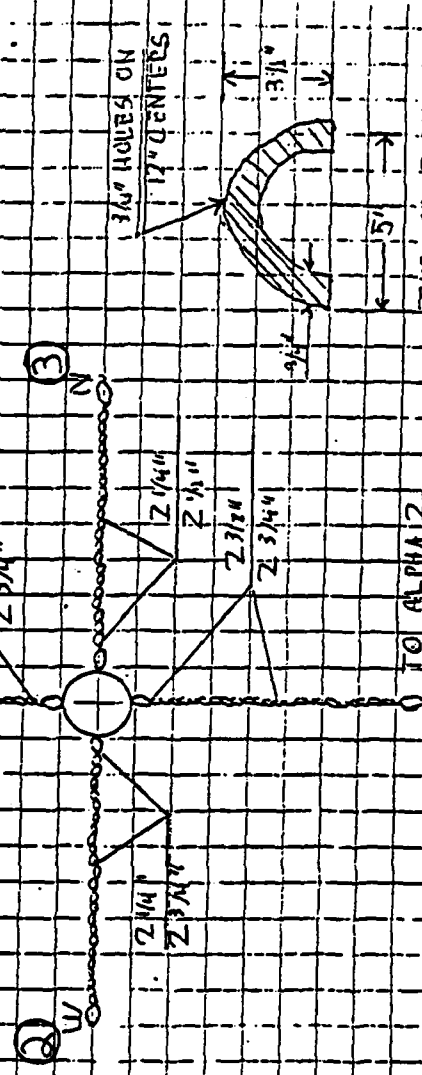
FLEET MOORING INSPECTION

N.T.S.



8-10

TO ALPHA 2



TYPE SECTION  
OF FENDER

DATE 11/16/79

AS BUILT 11/15/80

U.S. NAVY

SEAL BEACH WEAPONS STATION

N-62474-79-R-4752

MOORING NO. 1, 2, 3, 4, 5

ELECT MOORING INSPECTION

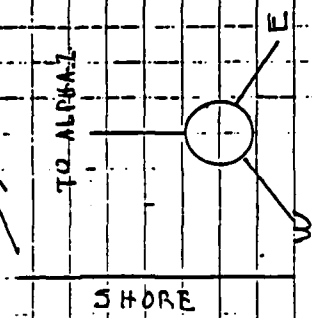
WATER DEPTH 14' 4"

N.T.S.

TIDE GAGE

ADJ. W.D.

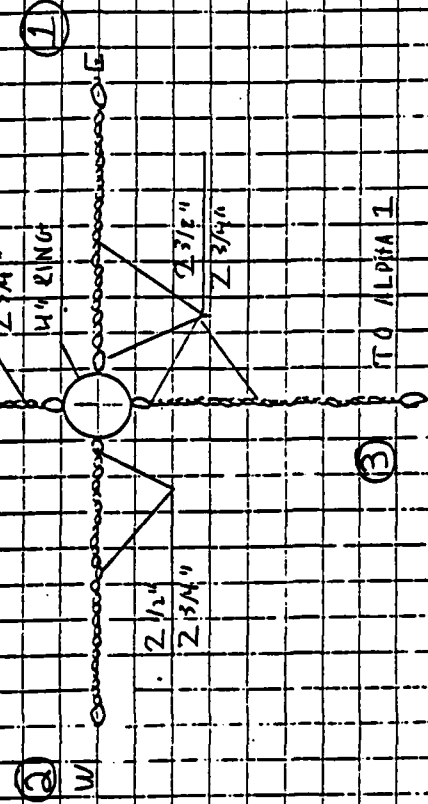
41



BUOY G-2 OF 10  
NO LOWER FENDERS  
BODY FINE = 3/4"

Installed Zinc Anode  
On Buoy From  
Alpha 13 - Drunken  
Sh #120

B-11



DATE 11/15/79

AS BUILT 11/15/81

U.S. NAVY

SEAL BEACH WEAPONS STATION

FLEET MOORING INSPECTION

N-62474-79-R-4242

MOORING NO. ALPHA 13

WATER DEPTH 23

TIDE (15:00) +2

NOT 21

BOAT GRADE 39

Buoy was from  
OSC 5, a drum  
buoy 8' x 14' 0"  
Buoy was overhauled  
and 21042 installed

4

SHORE

S

W

N

E

S

W

N

E

S

W

N

E

S

W

N

E

S

W

N

E

S

W

N

E

S

W

N

E

S

W

N

E

DATE 11/16/79	U.S. NAVY	N-62474-79-B-4252
AS BUILT 1/15/81	SEA BEACH WEAPONS STATION	MOORING NO. ALPHA 14
	FEET MOORING INSPECTION	WATER DEPTH 43
	N.T.S.	TIDE CL: 00 145
		ADT: 10 321

TO ALPHA 2

BODY GRADE EQ

BODY EYE 2 3/4"

NO LOWER FENDERS

Buoy was from

Oscar 6 SN 146

The buoy was over-

hauled and since

inhabited.

This is a down buoy

DATE 11/16/79 U.S. NAVY SEAL BEACH WEAPONS STATION MOORING NO. ECHO 11

AS BUILT 11/15/81

FLEET MOORING INSPECTION

WATER DEPTH 44'

TIDE G10/00 15'

MOORING 41

BUOY GRADE 28'

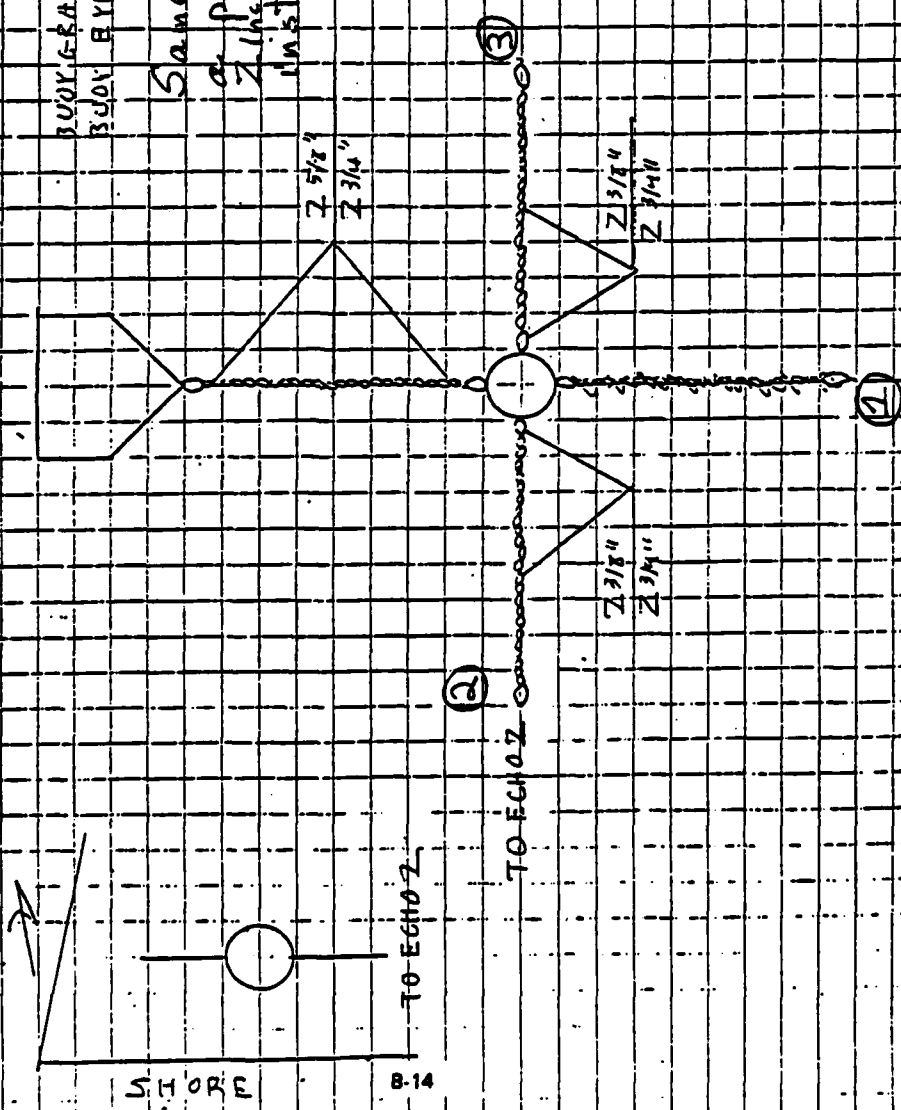
BUOY RYR 2' 11"

Same buoy S/N 22

as per Buoy

21000

Installed



DATE 11/16/79	U.S. NAVY	N-62474-79-B-4252
AS BUILT 1/5/8	SEAL BEACH WEAPONS STATION	MOORING NO. ECHO 1
	ELECT MOORING INSPECTION	WATER DEPTH 45'
	N.T.S.	TIDE @ 9:00 1.8
		ADJ. WD 42

TO ECHO 2

SHORE

TO ECHO 1

BUOY GRADE = 7  
BUOY EYE = 2 1/2'

Buoy is from Oscar 4  
a peg buoy s/n 138  
Buoy was overhauled  
and zincs installed.

CLEAN FLOOR VIS. = 0

DATE 11/16/79

AS BUILT 11/16/81

U.S. NAVY

SEAL BEACH WEAPONS STATION

N-62474-79-B-4252

MODRING NO. ECHO 131

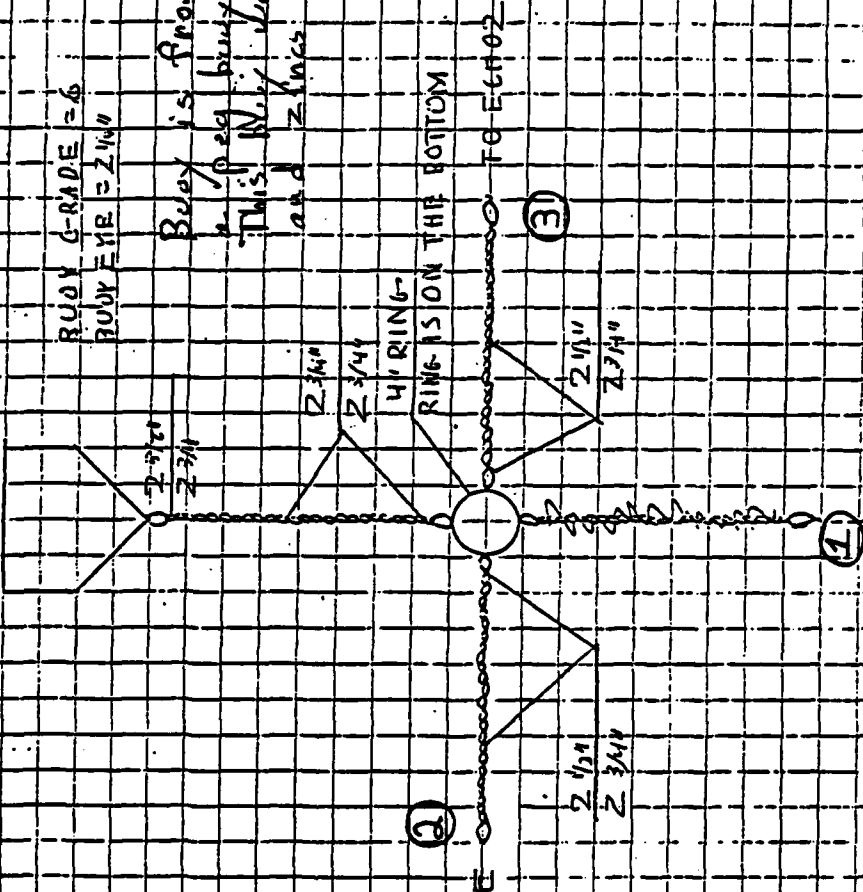
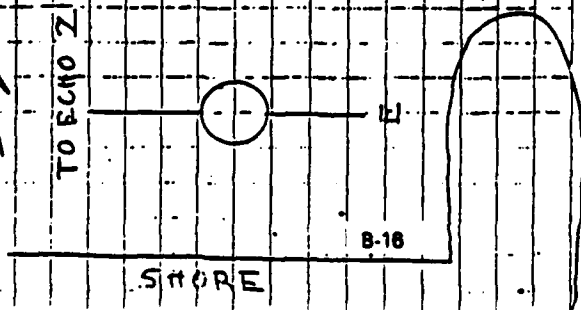
FLEET MODRING INSPECTION

WATER DEPTH 44

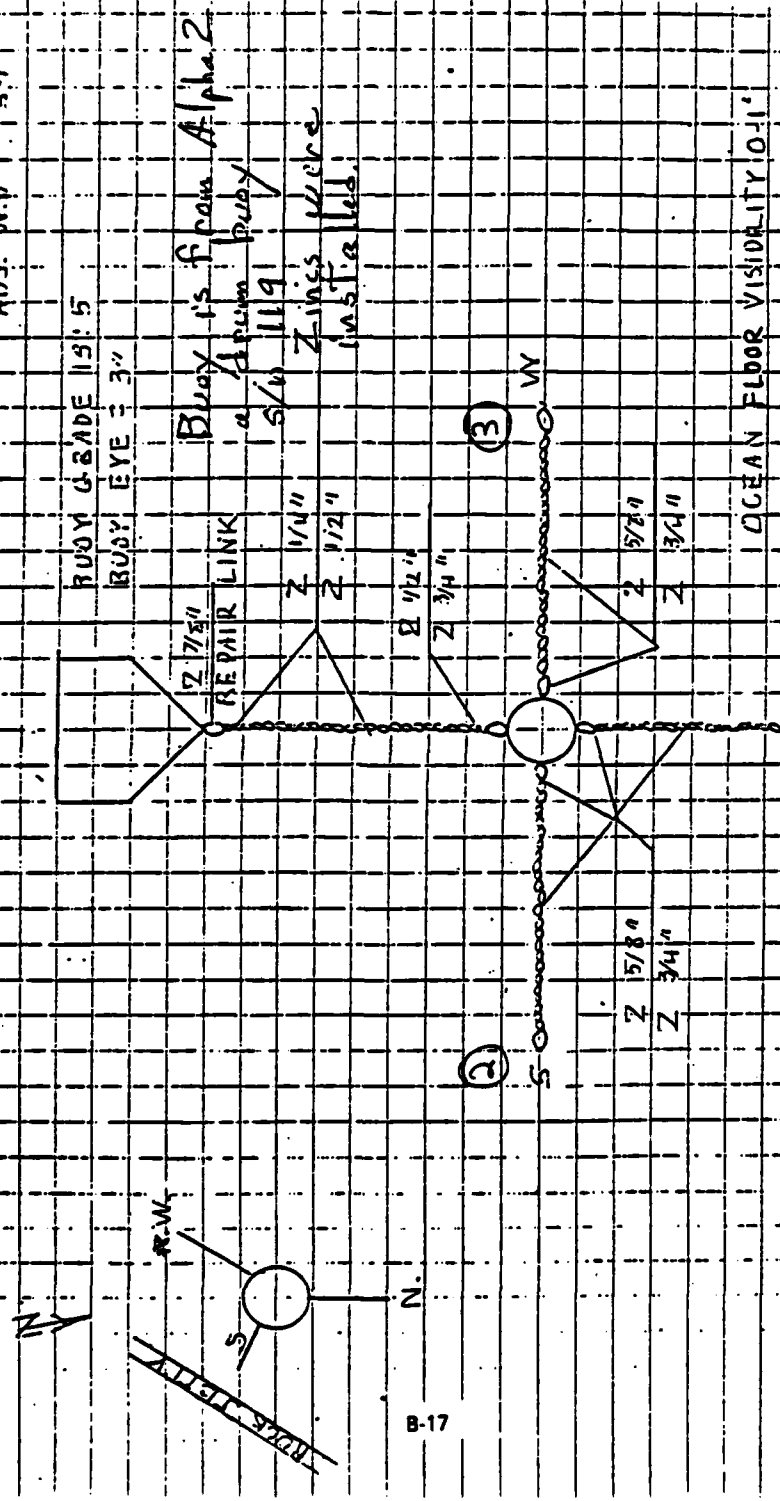
N.T.S.

TIDE @ 1400 43

ADDITIONAL 41

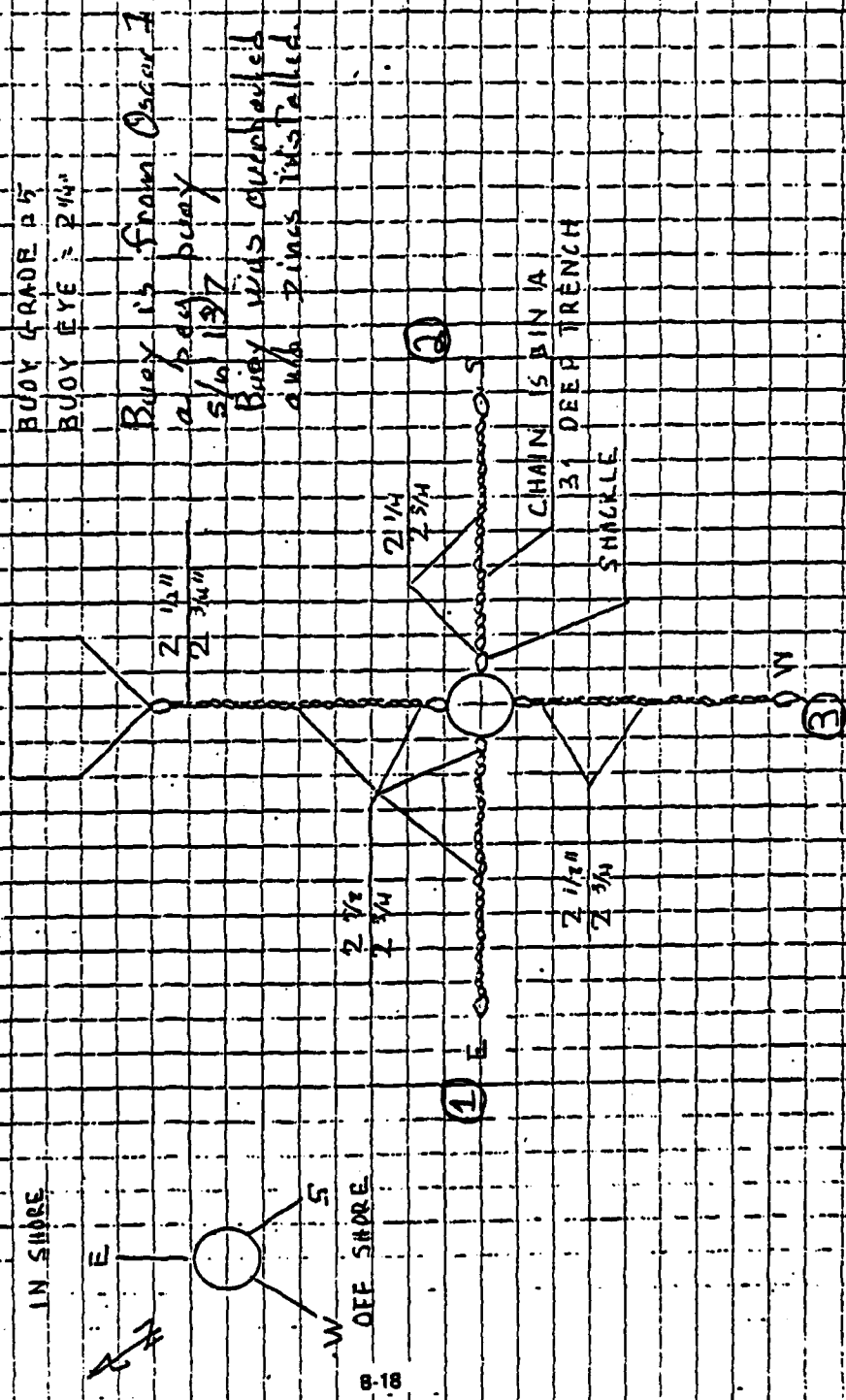


DATE 11/15/79  
 AS BUILT 11/15/81  
 U.S. NAVY  
 SEAL BEACH WEAPONS STATION  
 FLEET MOORING INSPECTION  
 N.T.S.  
 N-62474-79-R-4252  
 MOORING NO. OSCAR 1  
 WATER DEPTH 42'  
 TIDE 910'00' 1+3  
 ADJ. W.D. 35'





DATE 11/15/79	U.S. NAVY	N-62474-79-B-4252
AS BUILT 11/15/81	SEAL REACH WEAPONS STATION	MOORING NO. OSCAR 2
	FLEET MOORING INSPECTION	
	N.T.S.	
		WATER DEPTH 40
		TIDE @ 12:00 +2
		NO. 1 W D 32
		BUOY GRADE 05
		BUOY EYE 2 1/4"
		BUOY IS FROM OSCAR 7
		a buoy buoy
		5/10/1977
		BUOY WAS OUTDATED
		and pins installed



DATE 11/15/74

AS BUILT 1/5/81

U.S. NAVY

SEAL BEACH WEAPONS STATION

ELECT MOORING INSPECTION

N 162474-7918-4252

MOORING NO. OSCAR 131

WATER DEPTH 40

TIDE G 13.30

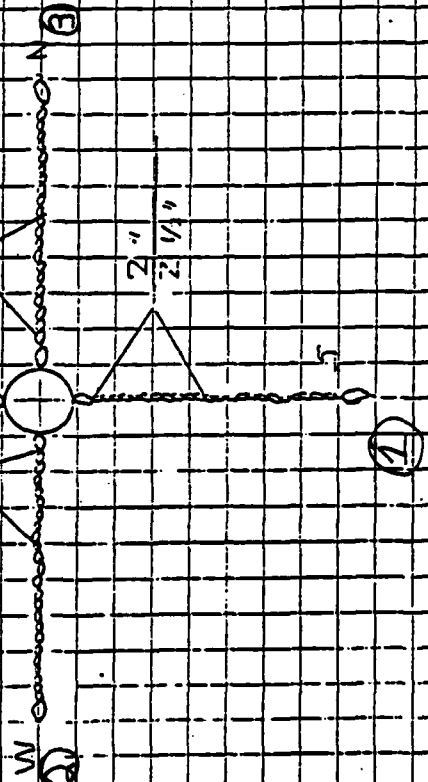
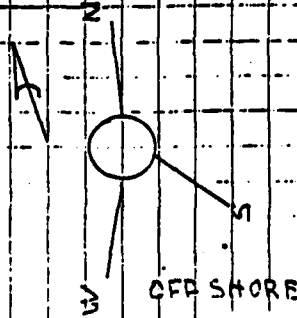
ADT WD 39

BUOY GRADE = 5

BUOY EYE = 2 3/4"

Buoy is from Alpha 4  
in bottom buoy  
3/11/41  
Zincs were installed

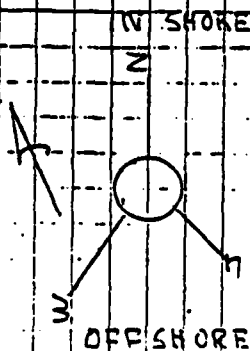
INSHORE



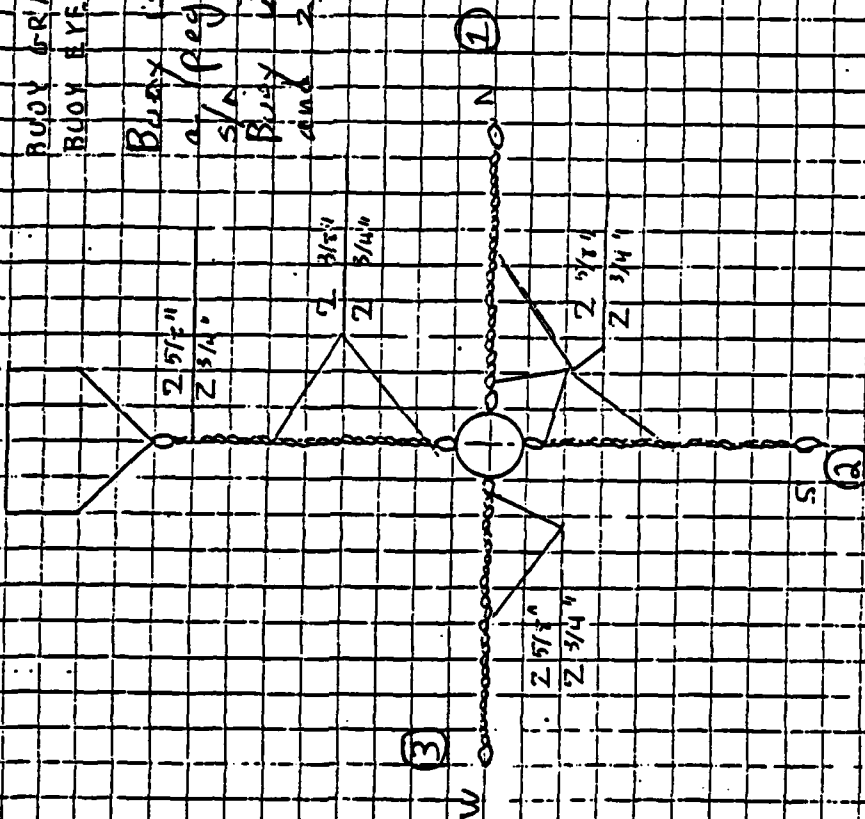
DATE 11/15/79  
 AS BUILT 11/15/81  
 U.S. NAVY  
 SEAL REACH WEAPONS STATION  
 EULET MODRING INSPECTION  
 N 62474-79-B-4252  
 MODRING NO. OSCAR 14  
 WATER DEPTH 40  
 TIDE 614-00 +1  
 ADJ. WD. 39

BUOY GRADE 216  
 BUOY EYE 3"

Buoy is from Oscar 8  
 a peg buoy  
 s/a 41  
 Buoy was overhauled  
 and zincs installed



B-20



DATE 11/15/79

As Buil: 1/15/81

U.S. NAVY

SEAL BEACH WEAPON'S STATION  
FLEET MOORING INSPECTION

# FLEET MOORING INSPECTION

151N

N-62474-79-B-4252

MOORING NO. OSCAR 15

WATER DEPTH 34

TODD E. (4.30); #2

Абт. У. Р.	32
------------	----

BUDY, GRADE = 7

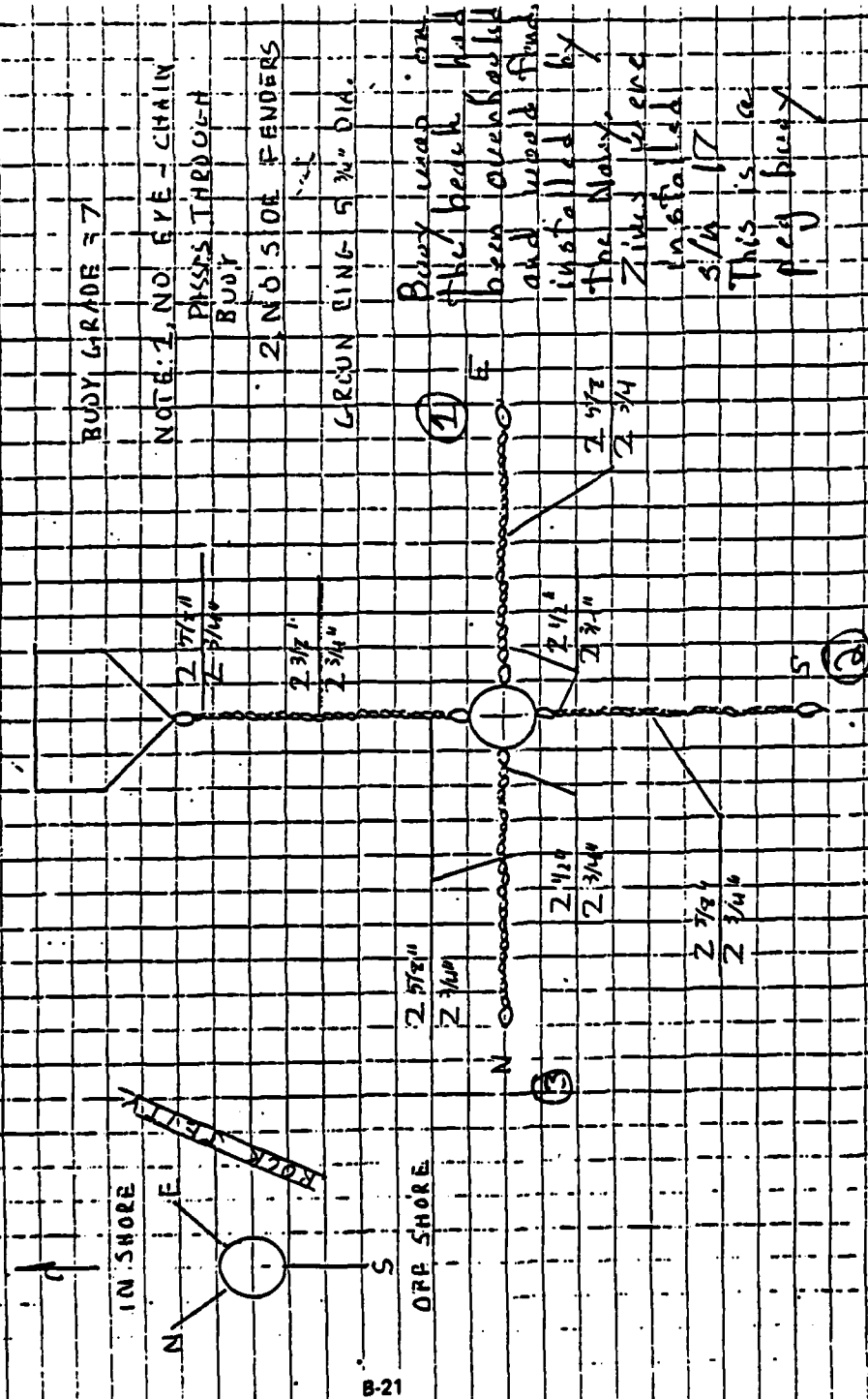
NOTE: 1, NO EYE - CHAIN

# Physics: Thermodynamics

Budır

21 NOV 5 1041 FENDERS

Green Ring - 5 1/2" dia.



DATE 11/15/74

AS BUILT 11/15/81

U.S. NAVY

SEAL BEACH WEAPONS STATION

ELECT MOORING INSPECTION

N 62474-7918-1252

MOORING NO. OSCHRL 6

WATER DEPTH 23

TIDE @ 1500 12

ADJ. WD 31

BUCK GRADE 25

BUCK RIVE 3"

NOTE: NO LOWER FENDERS

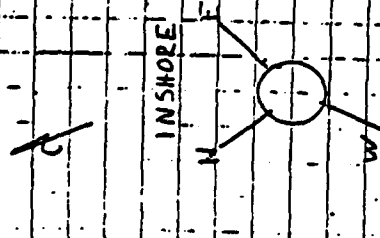
ON THE BUOY

Buoy is from  
Eldo 2

Peg buoy  
18/8 211

Z lines  
ins. tall ch.

Note The anchor  
and chain are  
badly sandblasted



INSIDE

OFFSHORE

REPAIR LINK

(3)

RING

(1)

(2)



DATE 11/15/79

AS BUILT

U.S. NAVY

REACH WEAPONS STATION

FUEEL MOORING INSPECTION

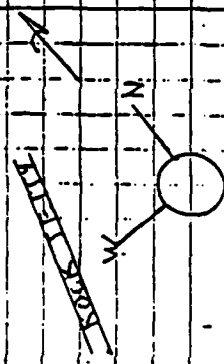
N-62474-79-R-4752

MOORING NO. 024752

WATER DEPTH 51

TIDE CLIP

ADJUSTED



N.T.S.

2 3/4"

2 3/4"

2 1/4"

2 5/8"

BUOY GRADE = 41

\* ONE HALF OF TOP WOOD

FENDER NEEDS REPLACING

BUOY EYE = 2 3/4"

This buoy is from

Order 3 a pig

buoy s/n 135

This buoy was

overhauled and

zincs installed

OCEAN FLOOR VIS. 0-1'

SURFACE VISIBILITY 4'

**ANNEX C**  
**SAMPLE INSPECTION FORMS**

Figures C-1 and C-2 depict two forms divers may use to record measurements and orientations respectively.

Figure C-3 is for use by the Project Engineer to summarize pertinent data.



MOORING NO.: \_\_\_\_\_ CLASS: \_\_\_\_\_ LOCATION: \_\_\_\_\_ LAT: \_\_\_\_\_ LONG: \_\_\_\_\_  
 WATER DEPTH: \_\_\_\_\_ TYPE MOORING: ☐ RISER ☐ TELEPHONE ANCHOR SIZE/TYPE: \_\_\_\_\_ BUOY TYPE: \_\_\_\_\_  
 DATE: \_\_\_\_\_ DIVER: \_\_\_\_\_ BOTTOM TYPE: ☐ SAND ☐ MUD ☐ CLAY ☐ CORAL ☐ ROCK

COMPONENTS	NI	CONDITION					U/W VOLT READING	COMMENT
		NEW	SINGLE LINK %			DOUBLE LINK %		
			90+	80+	80-			
BUOY TOP HARDWARE								
NEAR BUOY								
MIDDLE								
NEAR GRD RG								
GROUND RING								
GROUND LEG NO. —								
WEARPOINT								
UPPER END								
GROUND LEG NO. —								
WEARPOINT								
UPPER END								
GROUND LEG NO. —								
WEARPOINT								

D = destroyed; broken, or missing  
 NI = not inspected, inaccessible

FIGURE C-1.

TRUE BEARING OF GROUND LEGS

T.N.

A



FIGURE C-2.

C-3

MOORING # _____	CLASS _____
INSPECTION DATE _____	TYPE _____
BOTTOM TYPE _____	WATER DEPTH _____
<hr/>	
BUOY TYPE _____	LEG C LENGTH _____
DIMENSIONS _____	EXPOSED LENGTH _____
CONDITION _____	TYPE CHAIN _____
TOP HARDWARE _____	LINK WIDTH _____
BOTTOM HARDWARE _____	WIRE DIAM. _____
RISER LENGTH _____	
TYPE CHAIN _____	
LINK WIDTH _____	
WIRE DIAM. _____	
	LEG D LENGTH _____
	EXPOSED LENGTH _____
	TYPE CHAIN _____
	LINK WIDTH _____
	WIRE DIAM. _____
GROUND RING LOC. _____	
OUTER DIAM. _____	
WIRE DIAM. _____	
CONDITION _____	
LEG A LENGTH _____	RISER CONNECTIONS _____
EXPOSED LENGTH _____	
TYPE CHAIN _____	
LINK WIDTH _____	
WIRE DIAM. _____	
	LEG CONNECTIONS _____
LEG B LENGTH _____	OTHER _____
EXPOSED LENGTH _____	
TYPE CHAIN _____	
LINK WIDTH _____	
WIRE DIAM. _____	

FIGURE C-3. MOORING DATA SUMMARY FOR PREPARATION OF "AS BUILTS"

END

DATE  
FILMED

6 - 86